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14. ABSTRACT The evolution of the Air-Sea Battle concept into the Joint Concept for Access and Maneuver in the Global Commons (JAM-GC) provides an opportunity for Joint planners to apply new and creative concepts for achieving cross-domain synergy against the Anti-Access/Area Denial (A2/AD) challenge. An important part of this evolution is incorporating the U.S. Army into the concept to provide the Joint Force with additional options and capabilities while at the same time adding complexity to the dilemmas faced by the enemy. This paper specifically analyzes how Army Attack/Reconnaissance Aviation can support the Joint Force in the JAM-GC. The People's Republic of China's A2/AD strategy was used to analyze the employment options and feasibility of Army Attack/Reconnaissance Aviation operations against a near-peer, complex threat. This analysis provides examples, insights, and frameworks for the employment of Army Attack/Reconnaissance Aviation and its inclusion in the broad JAM-GC. These will need to be further scaled and refined by operational planners to meet the demands of an evolving and wide-ranging threat and operating environment. This paper also addresses some of the risks associated with Army Attack/Reconnaissance Aviation employment and provides recommendations for Joint and Army planners to further integrate Army Aviation into JAM-GC to achieve better cross-domain synergy.					
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**The Evolution of Air-Sea Battle: How Army Attack/Reconnaissance Aviation Fits into
the Joint Concept for Access and Maneuver in the Global Commons**

by

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**A paper submitted to the Faculty of the Naval War College in partial satisfaction of the
requirements of the Department of Joint Military Operations.**

**The contents of this paper reflect my own personal views and are not necessarily
endorsed by the Naval War College or the Department of the Navy.**

Signature: _____

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Paper Abstract

The evolution of the Air-Sea Battle concept into the Joint Concept for Access and Maneuver in the Global Commons (JAM-GC) provides an opportunity for Joint planners to apply new and creative concepts for achieving cross-domain synergy against the Anti-Access/Area Denial (A2/AD) challenge. An important part of this evolution is incorporating the U.S. Army into the concept to provide the Joint Force with additional options and capabilities while at the same time adding complexity to the dilemmas faced by the enemy. This paper examines how Army Attack/Reconnaissance Aviation can support the Joint Force in the JAM-GC. The People's Republic of China's A2/AD strategy was used to analyze the employment options and feasibility of Army Attack/Reconnaissance Aviation operations against a near-peer, complex threat. This analysis provides examples, insights, and frameworks for the employment of Army Attack/Reconnaissance Aviation and its inclusion in the broad JAM-GC. These will need to be further scaled and refined by operational planners to meet the demands of an evolving and wide-ranging threat and operating environment. This paper also addresses some of the risks associated with Army Attack/Reconnaissance Aviation employment and provides recommendations for Joint and Army planners to further integrate Army Aviation into JAM-GC to achieve better cross-domain synergy.

“We must think anew, act anew. We must disenthrall ourselves from the past and then we shall save our country.”¹

-Abraham Lincoln

In 2009, the United States released the Air-Sea Battle (ASB) concept to counter the rising Anti-Access/Area Denial (A2/AD) threat posed by potential global competitors.² Despite the joint and multi-domain approach to counter A2/AD put forth in the concept, in practice, it led to a predominantly Naval and Air Force approach to the problem. The maritime nature of the PACOM area of responsibility, the intuitive evolution of AirLand Battle to contend with a maritime power, and the U.S. Army’s preoccupation with wars in Iraq and Afghanistan led to the almost complete exclusion of land forces from the concept. In 2015, the Department of Defense leadership recognized the risk assumed due to this self-imposed limitation, ordered a revision to the concept, and renamed it the Joint Concept for Access and Maneuver in the Global Commons (JAM-GC). When the revision was announced a DOD spokesman noted, “the missing part of the Air-Sea Battle concept was the land portion, basically how the land forces could be used to allow U.S. forces to gain access to a contested area.”³ This revision to Air-Sea Battle provides an excellent opportunity for new and creative approaches to the A2/AD challenge that incorporate the broad range of capabilities within the Joint Force.

Army Attack/Reconnaissance Aviation provides capabilities that enable the cross-domain synergy that is foundational to JAM-GC and allows the Joint Force Commander to present the enemy with multiple dilemmas to effectively achieve operational and strategic objectives. To clearly frame the problem in the context of a near-peer competitor that

¹ Congressional Research Service, *China Naval Modernization: Implications for U.S. Navy Capabilities -- Background and Issues for Congress*, by Ronald O'Rourke, pg. 81.

² Department of Defense, Air-Sea Battle Office, *Air-Sea Battle: Service Collaboration to Address Anti-Access & Area Denial Challenges* (2013), pg. 1, accessed April 12, 2016, <http://navylive.dodlive.mil/files/2013/06/ASB-26-June-2013.pdf>.

³ Sam LaGrone, "Pentagon Drops Air Sea Battle Name, Concept Lives On," U.S. Naval Institute News, January 20, 2015, accessed April 12, 2016, <https://news.usni.org/2015/01/20/pentagon-drops-air-sea-battle-name-concept-lives>.

currently presents the most complex A2/AD challenge, the strategy adopted by the People's Republic of China (PRC) will be used for this analysis and discussed first. Second, to provide doctrinal context for this discussion, the hierarchy of concepts encompassed by the overarching Joint Operational Access Concept (JOAC) will briefly be discussed. Third, the capabilities of Army Attack/Reconnaissance Aviation will be explored to provide background from which to assess the feasibility of employment. Fourth, capability analysis and historical case studies will be presented to demonstrate army aviation capabilities that can support the JAM-GC concept. Fifth, to test the robustness of this thesis the most likely counterargument, that Army Aviation would simply duplicate capabilities already provided by the USMC and Naval Aviation, will be examined. In closing, conclusions and recommendations for Joint and Army planners will be presented for consideration as the JAM-GC is developed and refined.

Anti-Access / Area Denial

A2/AD is a multilayered strategy consisting of two distinct but complementary efforts with the goal of preventing the United States from achieving its operational and strategic objectives. The Anti-Access effort “refers to those actions and capabilities, usually long range, designed to prevent an opposing force from entering an operational area.”⁴ The Area Denial effort “refers to those actions and capabilities, usually of shorter range, designed not to keep an opposing force out, but to limit its freedom of action within the operational area.”⁵ A broad spectrum of potential American adversaries, from non-state actors to near-peer competitors, have adopted some form of this strategy.⁶ The gamut of A2/AD threats

⁴ Department of Defense, CJCS, *Joint Operational Access Concept*, 1st ed. (2012), pg. 6.

⁵ *Ibid.*

⁶ John Gordon, IV and John Matsumura, *The Army's Role in Overcoming Anti-Access and Area Denial Challenges*, report (Santa Monica: RAND Corporation, 2013), pg. 5, accessed April 16, 2016, http://www.rand.org/content/dam/rand/pubs/research_reports/RR200/RR229/RAND_RR229.pdf

around the globe prohibit a one size fits all answer to defeating the strategy but the conclusions and recommendations drawn from the PRC threat can be scaled, refined, or serve as a starting point for further analysis against the spectrum of potential adversaries.

After lessons learned from American military operations during Operation Desert Storm and the Taiwan Straits crisis of 1996, the PRC adopted a military modernization effort focused on the strategy of A2/AD to deny the United States access to and freedom of action in the western Pacific.⁷ The PLA A2/AD strategy is comprehensive and incorporates equipment, doctrine, and Tactics, Techniques and Procedures (TTPS) to disrupt and defeat American power projection. To remain within the scope of this analysis, the following outline of capabilities is not all inclusive but focuses on key capabilities relevant to the discussion.

Two key capabilities the PRC has developed to achieve the Anti-Access effort are long range precision strike and counterspace. Medium and Intermediate Range Ballistic Missiles (MRBM/IRBM), Land Attack Cruise Missiles (LACM), and Anti-Ship Cruise Missiles (ASCM) provide the bulk of the PRCs long-range precision strike capability. Reference figure 1 in Appendix A for a graphical depiction of ranges. The newest IRBM, the DF-26 has an estimated range between 1,620 – 2,160 nm placing U.S. bases from Okinawa to Guam at risk.⁸ The Chinese have developed Anti-Ship Ballistic Missile (ASBM) variants, such as the DF-21D, capable of hitting large slow moving maritime targets such as American Aircraft Carriers within 900 nm of the Chinese coast.⁹ China claims that the DF-

⁷ CRS, *China Naval Modernization: Implications for U.S. Navy Capabilities -- Background and Issues for Congress*, pg. 5.

⁸ Kelley Saylor, *RED ALERT: The Growing Threat to U.S. Aircraft Carriers*, report, February 2016, pg. 6, accessed April 15, 2016, <http://www.cnas.org/sites/default/files/publications-pdf/CNASReport-CarrierThreat-160217.pdf>.

⁹ Department of Defense, OSD, *ANNUAL REPORT TO CONGRESS: Military and Security Developments Involving the People's Republic of China 2015*, pg. 35, accessed April 14, 2016, http://www.defense.gov/Portals/1/Documents/pubs/2015_China_Military_Power_Report.pdf.

26 has ASBM capabilities at a range in excess of the DF-21.¹⁰ PRC LACMs and ASCMs can be launched from air, surface, and sub-surface platforms.¹¹ PRC Submarines and Fighter/Strike aircraft can extend the range of LACM/ASCMs out to an estimated 2,100 nm.¹²

For counterspace capabilities, the Chinese have developed and tested both anti-satellite missiles and potentially, an anti-satellite satellite.¹³ These technologies threaten the American Global Positioning System, communications, and beyond line of sight Unmanned Aerial System (UAS) operations, among other capabilities.

To achieve the Area Denial effort, the PRC has developed a robust Integrated Air and Missile Defense System (IADS), Precision Guided Rockets, Artillery, Missiles, and Mortars (G-RAMM), and a large fleet of fast attack missile boats. The IADS extends out to 300 nm from the Chinese coast and consists of early warning systems, fighter aircraft, and several Surface to Air Missile (SAM) systems.¹⁴ Russian built S-300 and domestic variant HQ-9 SAM batteries are capable of detecting and intercepting non-stealthy aircraft and ballistic missiles out to 80 nm.¹⁵ The PRC has recently purchased the upgraded S-400 system which extends the SAM range out to 200 nm.¹⁶ A spectrum of Air Defense Artillery (ADA) systems supplement these high-end SAM systems. They trade reduced range and fire control for greater portability and reduced cost. The opposite end of the spectrum from the new S-400 is the QW-1 family of Man-Portable Air Defense Systems (MANPADS) which are

¹⁰ Andrew S. Ericsson, "Showtime: China Reveals Two 'Carrier-Killer' Missiles," *The National Interest*, September 3, 2015, accessed April 14, 2016, <http://nationalinterest.org/feature/showtime-china-reveals-two-carrier-killer-missiles-13769>.

¹¹ DOD, *ANNUAL REPORT TO CONGRESS: Military and Security Developments Involving the People's Republic of China*, pg.34.

¹² Ibid.

¹³ Ibid, pg. 35.

¹⁴ Ibid.

¹⁵ Saylor, *RED ALERT: The Growing Threat to U.S. Aircraft Carriers*, pg. 3.

¹⁶ DOD, *ANNUAL REPORT TO CONGRESS: Military and Security Developments Involving the People's Republic of China*, pg. 36.

effective out to ranges of 5 km in a shoulder-fired system.¹⁷ The PRC's current fourth generation fighters have a combat radius up to 750 nm and in development stealthy fifth-generation fighters could extend that range out to 1,000 nm.¹⁸ China's KJ-2000 and KJ-500 early warning aircraft provide a "detection range well beyond [China's] borders."¹⁹

For G-RAMM, the Chinese have developed several short range ASCMs that can be deployed from surface and sub-surface combatants and coastal defense cruise missiles that can be launched from land-based platforms. The PRC currently fields over 1,200 Short Range Ballistic Missiles (SRBM) with ranges less than 1,000 km, multiple rocket launchers with ranges out to 220 km, and over 7,900 artillery pieces which possess varying degrees of precision munition capability.²⁰

The PRC's fast attack missile boat fleet comprises approximately 86 vessels, most of which are the Houbei-class missile boat (Type 022), supplemented by the 20 of the new and larger Jiangdao-class corvettes (Type 056)²¹. The majority of the of fast attack missile boats and all of the Jiangdao-class corvettes are armed with ASCMs and QW family SAMs.²²

Doctrine and Capabilities

JOAC is the overarching concept for addressing operational access in the context of the future operating environment defined by the Capstone Concept for Joint Operations.²³ The concept addresses how the U.S. will achieve operational access, defined as "the ability to project military force into an operational area with sufficient freedom of action to accomplish

¹⁷ Department of Defense, ATP 3-09.32: *JFIRE MULTI-SERVICE TACTICS, TECHNIQUES, AND PROCEDURES FOR JOINT APPLICATION OF FIREPOWER* (2016), pg. 121.

¹⁸ Saylor, *RED ALERT: The Growing Threat to U.S. Aircraft Carriers*, pg. 6.

¹⁹ Ibid, pg. 36.

²⁰ Ibid, pgs. 8, 78.

²¹ Ibid, pgs. 9, 79.

²² CRS, *China Naval Modernization: Implications for U.S. Navy Capabilities -- Background and Issues for Congress*, pgs. 32-33.

²³ DOD, *Joint Operational Access Concept*, pg. 3.

the mission.”²⁴ It is a warfighting concept that addresses opposed access against multi-domain A2/AD challenges. Fundamental to the JOAC is the requirement for a greater level of integration across services and domains at lower echelons than the Joint Force has operated at in the past. This central idea is termed cross-domain synergy and defined as the “complementary vice merely additive employment of capabilities in different domains such that each enhances the effectiveness and compensates for the vulnerabilities of the others—to establish superiority in some combination of domains that will provide the freedom of action required by the mission.”²⁵ Underneath this broad concept for how the Joint Force will achieve operational access are eleven general principles, called operational access precepts. The following five precepts are most relevant to the analysis:

- **Consider a variety of basing options.**
- **Seize the initiative by deploying and operating on multiple, independent Lines of Operations (LOO).**
- **Exploit advantages in one or more domains to disrupt enemy A2/AD capabilities in others.**
- **Disrupt enemy reconnaissance and surveillance efforts while protecting friendly efforts.**
- **Create pockets or corridors of local domain superiority to penetrate the enemy’s defenses and maintain them as required to accomplish the mission**²⁶

Nested within this overarching JOAC are supporting concepts that deal with more specific facets of overcoming the broad spectrum of A2/AD challenges. The Joint Concept for Entry Operations and JAM-GC are examples of two of these nested concepts. This outline provides the doctrinal framework for the following analysis. Next, the core capabilities of Army Attack/Recon aviation will be discussed.

The current Attack/Reconnaissance helicopter of the U.S. Army is the AH-64 Apache in two variants, D and E. The only difference relevant to this analysis is that the E model has

²⁴ DOD, *Joint Operational Access Concept*, pg. 1.

²⁵ Ibid, ii.

²⁶ Ibid, 17.

Level of Interoperability (LOI) four with an Unmanned Aerial System (UAS) and the Delta Model only possesses level two. LOI 2 can receive sensor data from the UAS while level four can control both the flight of the UAS and the operation of the sensor payload. The only fielded UAS compatible with LOI 4 control is the Army's MQ-1C Gray Eagle. The AH-64D/E has a combat radius of 120 km with a standard weapons configuration; this can be extended to beyond 400 km with external fuel tanks. One-way transit to a FARP would more than double those ranges. The Apache armament consists of a 30mm cannon with a max effective range of 1,700 meters, various models of 2.75-inch rockets effective out to as far as 5,000 meters, the Stinger anti-aircraft missile effective out to 4,500 meters, and various models of hellfire missiles with effective ranges up to 8,000.²⁷ The Apache also possesses several sensors for target acquisition. The Modernized Target Acquisition and Designation System (MTADS) has a day TV capability to laser designate and auto track tank-sized targets at 6,000 meters and a Forward Looking Infrared (FLIR) capability to laser designate and auto track tank-sized targets at 3,500 meters. The AH-64 D/E also possesses a Fire Control Radar (FCR) that allows it to detect, classify and prioritize ground and airborne targets at extended range.²⁸ The Army is currently modifying the FCR to better detect small maritime targets.²⁹ Integrated into the FCR turret is a Radio Interferometer (RFI) that provides passive cuing to threat ADA systems and the Apache is also equipped with Aircraft Survivability Equipment (ASE) that mitigates the risk of various ADA threats.

Army Combat Aviation Brigades currently operate two UAS in support of attack, reconnaissance, and security operations, the MQ-1C Gray Eagle and the RQ-7B Shadow.

²⁷ Department of the Army, *FM 3-04: Army Aviation* (2015), pg. 193.

²⁸ Army, *FM 3-04: Army Aviation*, pg. 194.

²⁹ Aaron Jensen, "Army's Apaches Bring Fight to Maritime and Littoral Operations," Center for International Maritime Security, January 26, 2016, accessed April 14, 2016, <http://cimsec.org/armys-apaches-bring-fight-to-maritime-and-littoral-operations/21499>.

The Gray Eagle is an upgraded version of the Air Force's MQ-1 Predator and has a combat range of up to 1200 km via Satellite-Communications (SATCOM) and 300 km via Line of Sight (LOS) communications with an endurance of over 22 hours. It can be armed with up to four Hellfire missiles and carries an electro-optical and infrared sensor payload as well as a laser designator/range-finder and radar.³⁰ The Shadow only possesses LOS communications capability limiting its combat range to 125 km with an endurance of over eight hours. It is unarmed but also carries an electro-optical and infrared sensor payload and laser designator/range-finder.

Army Attack/Reconnaissance Aviation in the JAM-GC

JOAC breaks down gaining and maintaining operational access into two inextricably linked tasks. The first is the combat task of overcoming the enemies A2/AD capability through the employment of combat power. The second is the logistical task of the movement and support of that combat power.³¹ To demonstrate the feasibility of employment, how the logistical task can be accomplished in support of Army Attack/Reconnaissance aviation operations will be analyzed first. Then, how Army Attack/Reconnaissance Aviation can support the combat task against the Anti-Access threat and the Area Denial threat will be examined.

Basing is critical to the logistical task of supporting combat power in the JAM-GC concept. Against the Chinese A2/AD threat large, mature land bases are at risk and the distances from these established bases to the objective area would be prohibitive for helicopter operations. There are several sea basing options for the AH-64D/E that would enable the movement required to extend the operational reach of Army Aviation and provide

³⁰ Army, *FM 3-04: Army Aviation*, pg. 203.

³¹ DOD, *Joint Operational Access Concept*, pg. 5.

the logistical support necessary to sustain combat operations. To conduct maintenance in support of long duration operations an Apache unit would require the maintenance capabilities found on larger ships such as Amphibious Assault Ships, Aircraft Carriers, and potentially the Navy's Mobile Landing Platform class ship. Army Aviation Units have proofed this concept and successfully trained and operated from most of these platforms for short durations, participating in major maritime training exercises such as RIMPAC.³² Apaches can also utilize more traditional forward land basing as the situation permits.

To further extend the operational reach and station time of Apaches, the Army relies upon Forward Arming and Refueling Points (FARP). Army Field Manual FM 3-04 defines a FARP as "a temporary facility that is organized, equipped, and deployed to provide fuel and ammunition necessary for the employment of aviation maneuver units in combat."³³ In the maritime domain, smaller ships such as cruisers and destroyers could serve as FARPs for Apaches. This construct would allow the larger, more vulnerable ships to maintain standoff from threat weapon systems while the smaller, less vulnerable surface combatants provide FARPs closer to the operational area. More conventional land-based FARPs can also be employed as the situation permits. These land-based FARPs can range a broad spectrum of size, capacity, duration, and security. At the low end are Forward Area Refueling Equipment (FARE) systems. These allow CH-47 Chinooks to air transport portable FARPs that can provide up to 2,320 gallons of fuel and be quickly established and collapsed.³⁴ The high end of the spectrum would be an established Tactical Assembly Area, Forward Operating Base, or captured airfield.

³² Jensen, "Army's Apaches Bring Fight to Maritime and Littoral Operations."

³³ Army, *FM 3-04: Army Aviation*, pg. 187.

³⁴ Department of the Army, *TC 1-400: Brigade Aviation Element Handbook* (2006), para. 5-40.

While there are many options for basing and FARPs for the AH-64, basing is the largest limiting factor for the employment of Army UAS in the A2/AD environment. The MQ-1C requires a runway of around 4,500 feet in length, and the RQ-7B requires an area 220 meters by 50 meters for launch and recovery operations. These constraints will limit their employment to land bases although, the RQ-7B requires a relatively small footprint and is small and readily transportable.

To analyze the combat task for JAM-GC under the JOAC, how Army Attack/Reconnaissance Aviation can be integrated into operations to defeat the A2/AD threat will be explored. It is important to keep in mind that although this analysis focuses on the use of Army Aviation, it is dependent upon the precepts of JOAC and the cross-domain synergy achieved through support from multiple capabilities within all the services. Army aviation is not the main effort but one supporting effort among many to achieve the operational and strategic objectives. For example, Army aviation operations will be reliant on and integrated into Joint Suppression of Enemy Air Defenses (JSEAD), counter early warning, electronic warfare/jamming, and counter air to name a few.

First, the use of Army Aviation against the PRC's anti area threat will be explored. The limiting factor for Army Aviation operations are the vast ocean distances that must be crossed to reach the PRC's territory. PRC Anti-Access weapons systems put the Joint Force at risk well outside the range of Army Aviation. The Army will be dependent upon the Joint Force to establish initial pockets or corridors of access to get within the operational range of the AH-64. Army Aviation can support the Joint Force in defeating and disrupting PRC anti-access capability in three ways once limited access is established: 1) Traditional attack, reconnaissance, and security in support of land forces conducting raids or interdiction

attacks. 2) ISR in support of Joint targeting and maneuver. 3) The destruction of early warning systems and mobile missile launchers.

A traditional use of Army Aviation would be conducting reconnaissance, security, and attack operations in support of Special Operations Forces (SOF) or conventional forces conducting land counter A2/AD operations. History has shown from World War II to the landings at Inchon that any major amphibious operation will include Army forces alongside the United States Marine Corps. Army aviation may be the correct choice to provide support if Army forces are used ashore because of their habitual direct support relationship. That consideration would be part of a broad calculus when determining which platform to use. Sea and forward land basing could be utilized as the situation dictates.

The long-range precision strike capability of the PRC is dependent upon accurate ISR to provide targeting data. The PRC's mobile missile launchers also add complexity to the Joint Force's targeting challenge for MRBM, IRBM, and ASBMs. AH-64D/Es can conduct reconnaissance to acquire mobile launch and early warning systems to provide targeting data for other platforms, destroy them with organic fires, or enable the Joint Force to bypass the threat. AH-64D/Es provide several unique capabilities distinct from fixed-wing aircraft. Their maneuverability and ability to fly Nap of the Earth (NAP) allow them to mask behind terrain and utilize cover and concealment increasing survivability and complicating detection. Their proximity to the ground and ability to hover enables them to observe under some forms of overhead cover and concealment and acquire targets and indicators that fixed wing aircraft would be unable to due to altitude and airspeed. The FCR and RFI also provide detailed ISR of the battlefield when threat conditions permit its operation. Apaches also provide a different type of persistence in the objective area than other platforms. Based upon

the threat, availability and security of holding areas and tactical assembly areas, and the availability of FARPs, helicopters may be able to provide greater persistence in the vicinity of the objective area. Another consideration for planners when trying to achieve cross-domain synergy is weaponeering. In a high-intensity conflict precision munitions will be a precious commodity and should be reserved for targets that are difficult to close with. At varying levels of cost and risk based upon the situation and threat the same levels of precision and target effects can be achieved. For example, a threat environment that favors Army Aviation maneuver allows the destruction of a mobile missile launcher with inexpensive and plentiful 30 mm rounds. In a different threat environment, a more expensive and scarce Joint Direct Attack Munition (JDAM) or Tomahawk Land Attack Missile (TLAM) may be required. If cross-domain synergy is achieved the Joint Force can use the right platform with the right munition against the right target and vastly improve combat power and effectiveness.

In the event the PRC degrades space-based platforms such as GPS the Apache can provide laser designation for weapons and employ organic fires to destroy targets mitigating some risk from the loss of satellite guidance. UAS operations beyond LOS through SATCOM will be degraded if not impossible if space assets are degraded or the electromagnetic spectrum is contested. LOI 4 control from the Apache would extend the operational reach of LOI 4 compatible UAS beyond LOS of the UAS ground control stations, significantly increasing their effectiveness.

The AH-64D/E provides capabilities for the detection and destruction of mobile launch and early warning systems that complement other platforms and methods. The cross domain synergy achieved forces the enemy to either spread its resources and defend against

multiple threats or assume risk in a given domain. As disruption and destruction is achieved more Joint Forces will gain access to the operational area compounding the problem for the enemy.

The opening shots of Operation Desert Storm provide an excellent historical case study of AH-64s operating within a cross domain synergy framework against an A2/AD capability. On the morning of 17 January 1991, Task Force Normandy, consisting of four Airforce MH-53 Pave Hawks and eight Army AH-64s, was the first coalition element to cross the Iraqi border. They were tasked with destroying Iraqi early warning radars in order to open an air corridor into Iraq to begin air campaign of Operation Desert Storm.³⁵ Allied planners determined that TLAMs would be ineffective because they could not provide Battle Damage Assessment (BDA) and confirm the radars were destroyed. They also determined that the risk to ground forces and fixed wing aircraft was too high. Therefore, planners determined that the Apache's armament, capability of flying low enough to evade radar, and ability to confirm BDA provided the best option to destroy the radar systems.³⁶ The Apaches were modified with external fuel tanks, which were non-standard at the time, to achieve the required range of over 700 nm to reach the objective. In 1991, the Apache lacked precise GPS navigation, so they were paired with advanced Air Force MH-53s to provide navigation. The destruction of the radar systems was synchronized to open an air corridor for coalition air forces to conduct strikes against Iraqi command and control infrastructure.³⁷ In the words of the Task Force commander, former Vice Chief of Staff of the Army GEN Dick Cody,

³⁵ Shane M. Deverill, *Bridging the Gap for the Operational Commander: Hunting Relocatable Ballistic Missiles with Advanced Attack Helicopters*, Master's thesis, U.S. Army Command and General Staff College, 1992, pg. 3, accessed April 10, 2016, <http://www.dtic.mil/dtic/tr/fulltext/u2/a255488.pdf>.

³⁶ John R. Borlick, Jr., "Shield to Storm: 101st Troops Fired First in Gulf War," *Fort Campbell Courier*, May 23, 1991, accessed April 14, 2016, http://www.fortcampbellcourier.com/special/article_aca4fc84-d5e3-11e5-b0d9-a30c769d5b0f.html.

³⁷ Deverill, *Bridging the Gap for the Operational Commander: Hunting Relocatable Ballistic Missiles with Advanced Attack Helicopter*, pg. 3.

“within three and a half minutes, we had knocked down everything they had there, rendered the sites totally out of commission, joined our teams up and sped toward the Saudi border.”³⁸ The success of this mission enabled the coalition air campaign that devastated Iraqi forces. This vignette provides an excellent example of creative and successful cross-domain synergy to achieve an operational objective.

Against the PRCs Area Denial threat many of the concepts presented in the discussion on Anti-Access apply. The general concepts for operations against PRC G-RAMM and IADS would be similar to that of countering mobile missile launchers and early warning radars. The additional capability that the Apache would provide the Joint Force against the PRC Area Denial threat is protection from the PRC’s fast attack missile boats. The Army Test and Evaluation Command tested the Apache against small boats, such as the Houbei. During this series of tests, the Apache was extremely successful in acquiring and destroying the boats and operating against their infrared and radar SAM protection.³⁹ The Apache’s sensors, ASE, armament, and most importantly maneuverability make it an excellent platform for acquiring and destroying small fast attack missile boats at standoff ranges from U.S. Naval surface combatants. Again, in the vein of cross-domain synergy, by assuming this mission with Apaches it would free up other platforms to conduct mission sets that led to their respective strengths.

As with any military concept, it is important to understand the risk that planners assume when utilizing Army Attack/Reconnaissance Aviation in the JAM-GC concept. Two of the most potentially catastrophic risks with regards to risk to the mission and risk to the force will be discussed next. First, the most catastrophic risk to the mission is that Army or

³⁸ Borlick, *Shield to Storm: 101st Troops Fired First in Gulf War.*

³⁹ Jensen, "Army's Apaches Bring Fight to Maritime and Littoral Operations."

AH-64D/E stakeholders attempt to make the mission fit the Apache rather than select the correct platform for the mission. This reasoning is antithetical to cross domain synergy, but it is a trap that planners have fallen prey to in the past and becomes more likely when constrained resources breeds interservice rivalry and the perceived or real requirements to justify expensive platforms. As discussed earlier, the Apache is one platform among many that provide complementary and supporting capabilities when utilized within a cross-domain synergy framework in a fluid operating environment against an evolving threat. When used in isolation or the wrong mission sets the outcome can be catastrophic. The 2003 Battle of An Najaf during Operation Iraqi Freedom provides a glaring example of this. 32 AH-64s were tasked with conducting a night time deep attack to destroy the Medina Division of the Republican Guard.⁴⁰ Along their route to the objective, in the vicinity of An Najaf, the formation encountered a well-coordinated aerial ambush that downed one Apache, and damaged almost all of the remaining aircraft, forcing them to abort their mission.⁴¹ Poor planning, ISR, SEAD, and integration with Joint Enablers, led to mission failure and for a time cast the future of Army rotary wing aviation into doubt.

The most catastrophic threat to the force under this concept is the isolation of Army AH-64D/Es tasked against the Anti-Access threat. Penetrations of the A2/AD defenses are at risk of extending themselves beyond the point of which they can be maintained and supported. If AH-64D/Es are isolated from their logistics support they will quickly become not mission capable due to fuel, armament, and maintenance requirements. Also, if Apaches are isolated from the joint enablers that provide the cross-domain synergy that enables Attack/Recon helicopter operations, then the aircraft's survivability will plummet.

⁴⁰ Richard J. Newman, "Ambush at Najaf," Air Force Magazine: Journal of the Air Force Association, October 2003, accessed April 15, 2016, <http://www.airforcemag.com/MagazineArchive/Pages/2003/October%202003/1003najaf.aspx>.

⁴¹ Ibid.

Counterargument

The most obvious counterargument against utilizing Apaches in the JAM-GC concept is that Naval and Marine Corps Aviation, particularly the USMC's AH-1Z Viper attack helicopter, already provide these capabilities. The argument would likely be made that the decision to incorporate Apaches stems from a desire to be included in the DOD's Pacific Pivot rather than an operational need. The counter to this argument is twofold. First, as described in the analysis above, the Apache provides many unique capabilities. Though the Apache and Viper are both attack helicopters, they have vastly different sensor, targeting, armament, performance, and survivability characteristics. Second, one of the precepts of JOAC is the ability to operate along multiple LOOs concurrently. Incorporating Apaches in with the cross-domain synergy approach provides more combat power to the Joint force and enables more concurrent LOOs across a larger area. Especially in this resource constrained environment, the aviation assets available to the Joint Force are finite and to underutilize any asset would cause the Joint Force to assume unnecessary risk.

Conclusion and Recommendations

The employment of Army Attack/Reconnaissance Aviation in the JAM-GC concept enables cross-domain synergy that greatly increases the combat power of the Joint force against the A2/AD challenge posed by nations such as the PRC. New and creative thinking will provide the joint force with additional options and capabilities while at the same time adding complexity to the dilemmas faced by the enemy. The analysis above provides examples, insights, and frameworks for the employment of Army Attack/Reconnaissance Aviation and its inclusion in the broad JAM-GC. These will need to be further scaled and refined by operational planners to meet the demands of an evolving and wide-ranging threat.

and operating environment. In closing, three recommendations for the Joint Force and Army from the DOTMLPF framework will be discussed.

Under Doctrine, Joint planners should include the employment of U.S. Army Attack/Reconnaissance Aviation in the JAM-GC. This guidance will drive the doctrinal framework that will enable the Army to create new or amend existing Mission Essential, collective, and individual tasks in support of the concept. This doctrinal framework is critical to driving the second recommendation.

With regards to training, Combat Aviation Brigades (CAB) regionally aligned with PACOM must incorporate these new and updated tasks derived from the first recommendation into their Mission Essential Task List (METL) and Unit Training Plan (UTP). These CABs must then be resourced to conduct maritime operations training and their training cycles synchronized with naval units and exercises. Army Aviation lacks the institutional experience associated with maritime operations and there will be inherent doctrinal, training, and materiel friction, some of which can only be resolved through experience and repetition.

The last recommendation concerns the Organization of Attack/Reconnaissance Helicopter Companies and Troops. Company and Troop headquarters are not manned for independent operations. They rely heavily on the Battalion/Squadron's primary and special staff to conduct long-duration operations. The manning of the headquarters platoons for companies and troops must be analyzed and amended to provide this lower echelon with the organic capacity to operate independent from the Battalion/Squadron headquarters as part of a joint team across a large operational area to better achieve cross domain synergy.

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Appendix A

Figure 1



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⁴² DOD, ANNUAL REPORT TO CONGRESS: *Military and Security Developments Involving the People's Republic of China* 2015 pg. 81.

